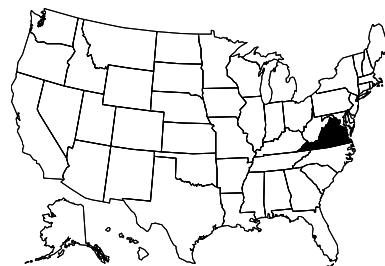


VIRGINIA

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Program Description

The Virginia Department of Environmental Quality (DEQ) Biological Monitoring Program (BMP) utilizes the study of bottom dwelling macroinvertebrate communities to determine overall water quality. Changes in water quality generally alter the kinds and numbers of these animals living in streams or other waterbodies. Like physical and chemical water quality monitoring data, biological monitoring data are used to assess water quality for support of aquatic life designated use and the Clean Water Act “fishable and swimmable” goals.

The BMP is composed of 150 to 170 stations that are examined annually during the spring and fall. Qualitative and semiquantitative biological monitoring has been conducted by the agency since the early 1970s. The USEPA Rapid Bioassessment Protocol (RBP) II was employed beginning in the fall of 1990 to utilize standardized and repeatable methodology. The RBPs produce water quality ratings of nonimpaired, slightly impaired, moderately impaired and severely impaired instead of the former ratings of good, fair and poor.

Currently, there are approximately 70 organizations throughout the Commonwealth with active citizen water quality monitoring programs. Biological parameters measured by citizen monitors often include benthic macroinvertebrates, fecal coliform bacteria, and/or chlorophyll *a*. A statewide organization, the Izaak Walton League of America Virginia Save Our Streams Program (IWLA VA SOS), took the lead in establishing relations with DEQ and the Department of Conservation and Recreation (DCR) to develop a statewide citizen monitoring program. IWLA VA SOS has a benthic macroinvertebrate citizen monitoring protocol that is widely used by many affiliate organizations. In 2000, VA SOS completed a two-year study, funded by DEQ, evaluating this protocol and developing a new protocol to more closely correlate with professional methods developed by EPA and used by DEQ.

Documentation and Further Information

Water Quality Assessment and Impaired Waters Report (combined 2002 305b and 303d), July 2002:
<http://www.deg.state.va.us/water/305b.html>

2000 Water Quality Assessment 305(b) Report: <http://www.deg.state.va.us/water/00-305b.html>

Water Quality Assessment Guidance Manual for 2002, 305(b) and 303(d) reports, July 2002:
<http://www.deg.state.va.us/pdf/water/wqassessguide.pdf>

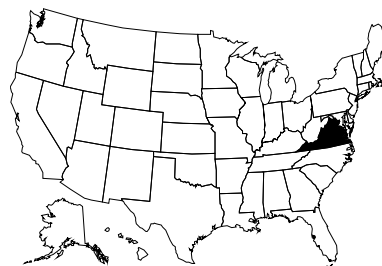
2001 Ambient Water Quality Monitoring Plan:
<http://www.deg.state.va.us/water/my01rpt.html>

Watershed Maps of Virginia Impaired Water Segments, 303(d) TMDL Priority List:
<http://www.deg.state.va.us/watermaps/>

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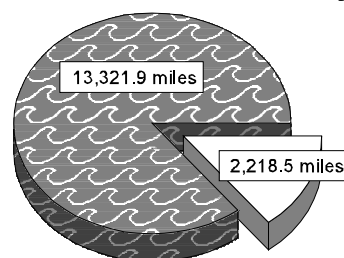
Programmatic Elements



Uses of bioassessment within overall water quality program	<input checked="" type="checkbox"/>	problem identification (screening)
	<input checked="" type="checkbox"/>	nonpoint source assessments
	<input type="checkbox"/>	monitoring the effectiveness of BMPs
	<input checked="" type="checkbox"/>	ALU determinations/ambient monitoring
	<input type="checkbox"/>	promulgated into state water quality standards as biocriteria
	<input checked="" type="checkbox"/>	support of antidegradation
	<input checked="" type="checkbox"/>	evaluation of discharge permit conditions
	<input checked="" type="checkbox"/>	TMDL assessment and monitoring
	<input type="checkbox"/>	other:
Applicable monitoring designs	<input checked="" type="checkbox"/>	targeted (i.e., sites selected for specific purpose) (<i>special projects only</i>)
	<input checked="" type="checkbox"/>	fixed station (i.e., water quality monitoring stations) (<i>comprehensive use throughout jurisdiction</i>)
	<input type="checkbox"/>	probabilistic by stream order/catchment area
	<input checked="" type="checkbox"/>	probabilistic by ecoregion, or statewide (<i>comprehensive use throughout jurisdiction</i>)
	<input type="checkbox"/>	rotating basin
	<input type="checkbox"/>	other:

Stream Miles

Total miles	50,329
<i>(determined using the National Hydrography Database)</i>	
Total perennial miles	50,329
Total miles assessed for biology*	15,540.4
fully supporting for 305(b)*	13,321.9
partially/non-supporting for 305(b)*	2,218.5
listed for 303(d)*	2,218.5
number of sites sampled (<i>on an annual basis</i>)*	150 -170
number of miles assessed per site	—

15,540.4 Miles Assessed for Biology



-  "fully supporting" for 305(b)
-  "partially/non-supporting" for 305(b)

*The numbers listed above were extracted from Virginia's 2002 combined 305(b)/303(d) report and represent stream and river miles assessed (evaluated and monitored) for aquatic life using chemical, physical and biological parameters. However, of the 2,218.5 total miles partially/non-supporting for 305(b), 661.4 miles were determined to be impaired based solely on biological (benthic) data.

Aquatic Life Use (ALU) Designations and Decision-Making

ALU designation basis	Single Aquatic Life Use	
ALU designations in state water quality standards	Three designations (apply to all State waters): recreational uses, e.g., swimming and boating; the propagation and growth of a balanced, indigenous population of aquatic life, including game fish, which might reasonably be expected to inhabit them; and the production of marketable resources, e.g. fish and shellfish.	
Narrative Biocriteria in WQS	none - Virginia has no formal/informal numeric procedures to support general aquatic life statement found in WQS	
Numeric Biocriteria in WQS	none	
Uses of bioassessment data in integrated assessments with other environmental data (e.g., toxicity testing and chemical specific criteria)	<input type="checkbox"/>	assessment of aquatic resources
	<input type="checkbox"/>	cause and effect determinations
	<input type="checkbox"/>	permitted discharges
	<input type="checkbox"/>	monitoring (e.g., improvements after mitigation)
	<input type="checkbox"/>	watershed based management
<i>Information not provided</i>		
Uses of bioassessment/biocriteria in making management decisions regarding restoration of aquatic resources to a designated ALU	Several TMDLs are addressing ALUS restoration because of poor bioassessment scores.	

Reference Site/Condition Development

Number of reference sites	information not provided	
Reference site determinations	<input checked="" type="checkbox"/>	site-specific
	<input checked="" type="checkbox"/>	paired watersheds
	<input type="checkbox"/>	regional (aggregate of sites)
	<input checked="" type="checkbox"/>	professional judgment
	<input type="checkbox"/>	other:
Reference site criteria	No reference site criteria. Reference sites are defined as best available, least impaired.	
Characterization of reference sites within a regional context <i>Information not provided</i>	<input type="checkbox"/>	historical conditions
	<input type="checkbox"/>	least disturbed sites
	<input type="checkbox"/>	gradient response
	<input type="checkbox"/>	professional judgment
	<input type="checkbox"/>	other:
Stream stratification within regional reference conditions <i>Information not provided</i>	<input type="checkbox"/>	ecoregions (or some aggregate)
	<input type="checkbox"/>	elevation
	<input type="checkbox"/>	stream type
	<input type="checkbox"/>	multivariate grouping
	<input type="checkbox"/>	jurisdictional (i.e., statewide)
	<input type="checkbox"/>	other:
Additional information	<input type="checkbox"/>	reference sites linked to ALU
	<input type="checkbox"/>	reference sites/condition referenced in water quality standards
	<input checked="" type="checkbox"/>	some reference sites represent acceptable human-induced conditions

Field and Lab Methods

Assemblages assessed	<input checked="" type="checkbox"/>	benthos (300-400 samples/year; multiple seasons, multiple sites – broad coverage for watershed level)
	<input type="checkbox"/>	fish
	<input type="checkbox"/>	periphyton
	<input type="checkbox"/>	other:
<hr/>		
Benthos		
sampling gear		D-frame, kick net (1 meter); 500-600 micron mesh
habitat selection		richest habitat and riffle/run (cobble)
subsample size		100 count
taxonomy		family
<hr/>		
Habitat assessments		visual based; performed with bioassessments
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Quality assurance program elements		standard operating procedures, quality assurance plan, periodic meetings and training for biologists, specimen archival

Data Analysis and Interpretation

Data analysis tools and methods	<input checked="" type="checkbox"/>	summary tables, illustrative graphs
	<input type="checkbox"/>	parametric ANOVAs
	<input type="checkbox"/>	multivariate analysis
	<input type="checkbox"/>	biological metrics
	<input type="checkbox"/>	disturbance gradients
	<input type="checkbox"/>	other:
<hr/>		
Evaluation of performance characteristics	<input type="checkbox"/>	repeat sampling
<i>Information not provided</i>	<input type="checkbox"/>	precision
	<input type="checkbox"/>	sensitivity
	<input type="checkbox"/>	bias
	<input type="checkbox"/>	accuracy
<hr/>		
Biological data		
Storage		EDAS
Retrieval and analysis		EDAS